Choose your Configuration

RETI*map*® Model 520

Modules	
SLO Basis Unit	●
ERG-Module	❍
OCT-Module	❍
FA -Module	❍

Stimulators	
Stimulator Projector (DLP)	●
Ganzfeld Q450	❍
Ganzfeld Q450SC	❍
Ganzfeld Q450SCX	❍
19" Stimulator Monitor	❍
BABYflash	❍
MINIganzfeld	❍
Pattern Handheld	❍

Amplifier channels	
2 Channels	●
4 Channels	❍
6 Channels	❍
8 Channels	❍

Programs	
Pattern VEP	❍
Pattern ERG	❍
Pattern VEP	❍
Flash ERG	❍
Focal ERG	❍
EOG	❍
Multifocal ERG	❍
Multifocal VEP	❍
Multifocal science	❍
Glaucoma Screening	❍
Visual Acuity	❍
Nystagmography	❍
ON-OFF Response	❍
Photopic negative response	❍
S-Cone ERG	❍
Pupillometry	❍

Calibration tool	
Automatic Ganzfeld calibration	❍
Automatic Stimulator Monitor calibration	❍

● Standard ❍ Option

Standard Accessories		Part No
	DTL Electrode S (sterile) and connection cable Pack of 2 electrodes Pack of 2 cable	Part No 1000-510-336 Part No 1000-510-304-D
	EEG Gold-Electrodes Ø 10 mm Electrode, DIN connector 1,5mm Set 2 x red, 2 x blue, 1 x black DIN connector 1,5 mm	Part No 1000-316-300-D Part No 1000-316-301-D
	TEN20 Conductive and Adhesive Paste 230 g Paste 115 g Paste	Part No 1000-361-300 Part No 1000-362-300
	NuPrep Gel for Skin Preparation 115 g Gel	Part No 1000-370-300

Distributor:

ROLAND CONSULT
Electrophysiological Diagnostic Systems

Friedrich-Franz-Str.19, D-14770 Brandenburg, Germany
Phone: +49 3381 890-1034, Fax: +49 3381 890-2994
www.roland-consult.de, e-mail: info@roland-consult.de

17-51-1.3E

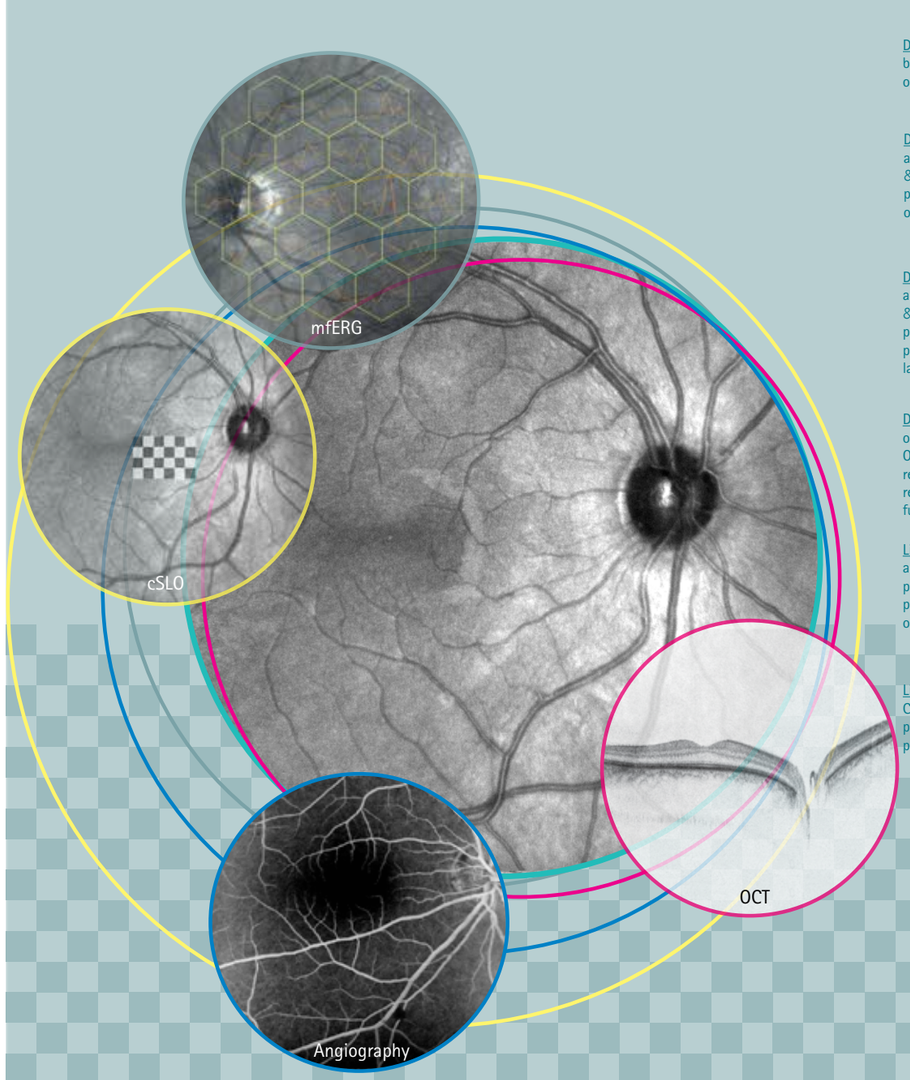
R

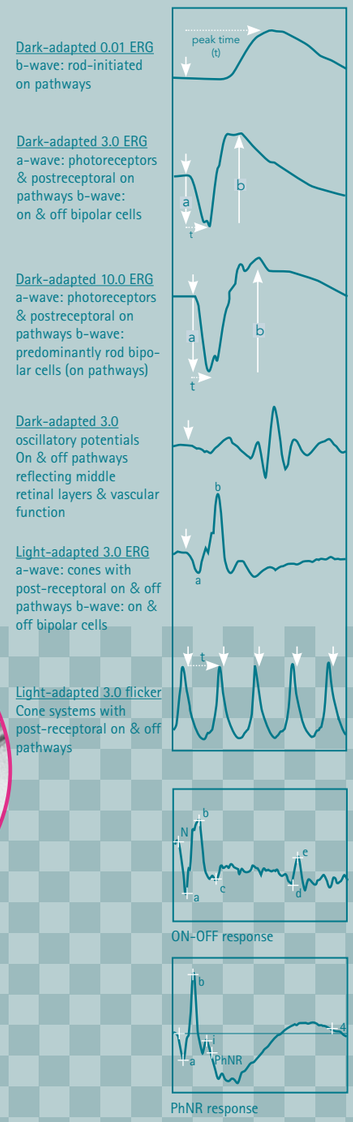
RETI*map* Model 520

Electrophysiology and Imaging

SLO ERG VEP FA OCT

ALL IN ONE





Dark-adapted 0.01 ERG
b-wave: rod-initiated on pathways

Dark-adapted 3.0 ERG
a-wave: photoreceptors & postreceptoral on pathways b-wave: on & off bipolar cells

Dark-adapted 10.0 ERG
a-wave: photoreceptors & postreceptoral on pathways b-wave: predominantly rod bipolar cells (on pathways)

Dark-adapted 3.0
oscillatory potentials
On & off pathways reflecting middle retinal layers & vascular function

Light-adapted 3.0 ERG
a-wave: cones with post-receptoral on & off pathways b-wave: on & off bipolar cells

Light-adapted 3.0 flicker
Cone systems with post-receptoral on & off pathways

ON-OFF response

PhNR response

Certification:
Quality Management System
EN ISO 13485
TÜV Rheinland

Made in Germany

ROLAND CONSULT
Electrophysiological Diagnostic Systems

Product overview

Operator Unit Ganzfeld

Scanning Laser Ophthalmoscope

Stimulator Monitor

Ganzfeld

alternative Tilting Stand

The RETImap Model 520 is a new high technology combination of electrophysiology and fundus imaging with OCT and Angiography. It's a modular system and the basic unit consists of:
- infrared confocal Scanning Laser Ophthalmoscope cSLO
- integrated DLP stimulator unit

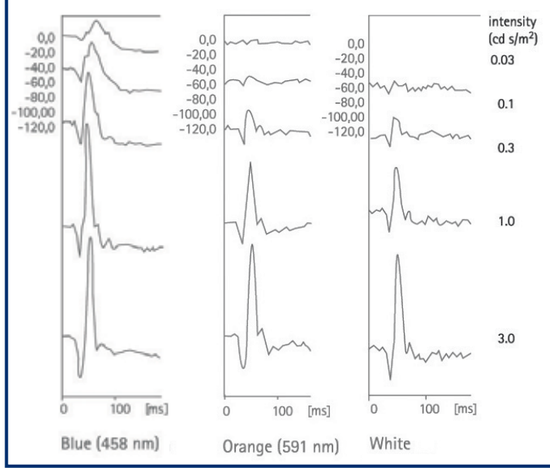
and can be combined with:
- Electroretinogram (ERG) Module + Visual Evoked Potentials (VEP) Module
- Fluorescein Angiography (FA) Module +Autofluorescence (AF) Module
- Spectral Domain Optical Coherence Tomography (SD-OCT) Module
- Amplifier 2,4,6, or 8 channels
- Flash Stimulators: Ganzfeld, BABYflash, MINIganzfeld, Pattern Handheld
- Pattern Stimulators: 19" TFT Monitor, Pattern Handheld (LED)

The basic unit delivers a highly detailed image of the fundus. The integrated Roland Consult Fundus Eye Tracker (RCFET) supports to find exactly the same position of past examinations. The fixation target is shown by a high resolution DLP projector. Colours and design of the target can be customizable. Possibility of standard programs:
- Optical Coherence Tomography (OCT)
- Fluorescein Angiography, Auto fluorescence
- focal ERG, mf ERG
- focal VEP, mf VEP
- Pattern ERG,
- Flash ERG (Ganzfeld 6 steps),
- ON-OFF Response, Photopic Negative Response, S-Cone ERG
- EOG (fast, slow)
- Visual Acuity
- Glaucoma Screening Contrast Sensitivity
- Nystagmography
- Pupillometry

More different examinations are freely customizable.

The software includes many advanced features like FFT analyse, OFF-line-averaging and pre-trigger. All electrophysiological results can exactly overlay to the SLO image. Different combination of structure and function results in one protocol.

Ganzfeld ERG with different colours



Features:
- Delivered with standard ISCEV programs
- Additional programs Visual Acuity, Glaucoma Screening, S-Cone ERG, Photopic negative response
- Possibility to create own programs
- Automated impedance test can start every time
- Automatically analyze with placing the markers during the examination
- Automatically artifact elimination in all programs, also for mfERG and mfVEP
- Ganzfeld with 5 different colors and eye fixation camera
- Possibility to measure the pupil size automatically
- Optimized short screening tests for children
- Digital Filter for signal processing
- Show typical curve in the analyze and printout mode
- Delivery with normal values, it is easy to insert the own normal values
- Export all data to EXCEL
- Working in the LAN, Reader Stations
- Service via Team Viewer

Operating unit:
- Taking account of the existing technological level
- Intel core i5-2500 CPU (3.3 GHz), 2 GB RAM, HDD: 500 GB
- 24"TFT control monitor, keyboard
- Mouse, colour printer
- Table dimensions (W x H x D) 120 x 95±20 x 70 cm
- Software : Roland Software based on MS Windows, Nero, Antivirus, Team Viewer

Bio signal amplifier:
- 2, 4, 6 or 8 channel
- Type BF, check voltage 1,5 kV
- Impedance 2 x 100 MΩ, noise < 4µV(SS)
- Common mode rejection >120 dB
- Gain up to 150.000
- Sensitivity 10µV/div to 2 mV/div
- High pass: 20 Hz to 10 kHz
- Low pass : 0,02 Hz to 1 kHz

Stimulator monitor
- 19"-color monitor, max. luminance 220 cd/m²;
- high contrast
- Checkerboards, bars fields: full, half or quarter
- Pattern reversal / appearance/disappearance
- Software controlled contrast settings (3 % - 99 %)
- black and white or different colour settings
- variable fixation points,
- special pictures for children

MINIganzfeld

Pattern Handheld

BABYflash

Mavo Monitor

Ganzfeld Q450
The Ganzfeld consists of a 400 mm full field globe, with a central fixation LED and two EOG fixation LEDs. The brightness of these LEDs are software controlled and an infrared camera is integrated. There are two models Q450C and Q450SC. The Xenon tube module (X) for high intensity flash is optional available for both models.
Model Q450C(X): white, blue, red
Model Q450SC(X): white, blue, red, royal blue, green, amber
Stimulus ON-OFF
Stimulus white flash - standard intensity 3,0 cds/m²
- Interval -40 dB to +5 dB in steps of 5 dB

Stimulus colour flash:
- standard flash 3,0 cds/m²
- royal blue (455 nm) interval -50 dB to -5 dB in steps of 5 dB
- blue (470 nm) interval -45 dB to 0 dB in steps of 5 dB
- green (525 nm) interval -45 dB to 0 dB in steps of 5 dB
- amber (590 nm) interval -45 dB to 0 dB in steps of 5 dB
- red (625 nm) interval -45 dB to 0 dB in steps of 5 dB

Stimulus ON-OFF:
- all colours: 1 ms to 1000 ms adjustable in steps of 1 ms

Background Luminance: adjustable in 1,0 cd/m² steps
- white: 1000 cd/m²
- royal blue (455 nm): 100 cd/m²
- blue (470 nm): 200 cd/m²
- red (625 nm): 200 cd/m²
- green (525 nm): 500 cd/m²
- amber (590 nm): 750 cd/m²

simultaneous LED use to generate different flash/background colours

Option X:
- Xenon tube for white high flash
- Intensities: 9,5 cds/m² (+5 dB), 30 cds/m² (+10 dB), 95 cds/m² (+15 dB) For model Q450 SC(X) are additional flexible settings possible.

Option Flimmer check: (according Prof. Kremers)
Only for model Q450 SC(X)
For each colour:
- Selectable waveform type: sine wave, rectangular wave,
- Triangular wave, ramp up or ramp down
- Phase shift: 0°- 359° in steps of 1°
- Contrast: 0,1 % -100 % in steps of 0,1 %
- Stimulation frequency: 1 Hz - 150 Hz

Option: Pupillometry
- Full field Ganzfeld stimulation
- Resolution time 33 ms (30 images per second)
- Resolution pupil size 0.1 mm
- Examination settings number of cycles, cycle time, record time, flash time, flash intensity, averaging of cycles

OPTIONS
MINIganzfeld
- Flash Luminance: standard flash: 3,0 cds/m² white,
- Range -25 dB...+5 dB in steps of 5 dB
- Backlight: 10, 30, 50, 100, 450 cd/m²

Pattern Handheld
- Checkerboard: 10 x10 mm, fields á 5 x 5 mm
- Luminance 80 cd/m²; Pattern Reversal

BABYflash
- Standard flash: 3,0 cds/m² white, blue, red: range -25 dB...+10 dB
- Backlight: 10, 30, 50, 100, 450 cd/m²

Calibration Tool
- Measurement with Mavo Monitor via USB connection
- Automatic Ganzfeld calibration
- Automatic Stimulator monitor calibration

Moduls

SLO

Scanning Laser Ophthalmoscope Unit (SLO) It allows basic examinations and has following

Field of view:	30° x 30°
Laser source:	SLD 920 nm (IR Image)
Optical resolution:	<30 µm
Focus adjustment:	-15 to +15 diopter (D)
Digital image:	12 bit
Image Resolution:	512 x 512
Pupil size requirement:	≥ 2 mm
EyeTracker:	software module

ERG VEP

Module Electroretinogram (ERG) and Visual Evoked Potentials (VEP)

It allows simultaneous infrared laser monitoring during electrophysiological diagnostic. With the built-in stimulator, the high resolution DLP projector, it is possible to stimulate a large number of retinal locations and extract their responses.
The final result is a function map superimposed onto the fundus cSLO image. Regionally confined areas of dysfunction can be detected. The Roland Consult Fundus EyeTracker (RCFET) software helps to detect all eye movement artefacts during the test. This device can also be upgraded with the classical electrophysiological stimulators and programs.
The various electrophysiological functions are:

- **focal ERG**
- **multifocal ERG**
- **Pattern ERG**
- **Flash VEP**
- **Pattern VEP**
- **multifocal VEP**

Field of view:	25° x 25°
Monitor stimulator:	DLP projector
Brightness:	300 cd/m²
Vertical frequency:	60 Hz
Resolution:	800 x 600 Pixel
Color Stimulator RGB:	636nm/520nm/452nm
Stimulator Protocols:	focal ERG, multifocal ERG, Flash VEP and Pattern VEP
Control monitor:	10 inches

FA

Module Fluorescin Angiography (FA)

The RETImap Angiography module runs with a blue laser source 488 nm. It generates higher quality fundus images than alternative white light illumination photo systems, and since no flashes are involved, the system is more patient friendly. At the beginning of an injection the laser source automatically switches to Angiography mode and a video is recorded with an exact timestamp on every image. This helps the user to concentrate more on the patient during the examination and review the angiography images later. Another advantage of the laser system is the high speed of image acquisition. Instead of watching static images from early, mid, or late phase, it is easy to observe the dye in the vessels to localize narrowings and partial blockades in real time.

Laser source Blue:	488 nm
Digital image:	512 x 512
Record Mode:	15 pictures / sec

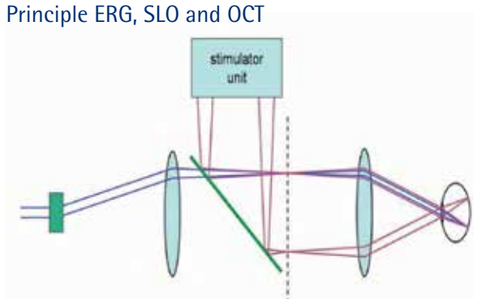
OCT

Module Optical Coherence Tomography (OCT)

The combination of RETImap cSLO + OCT enables the exact analysis of the morphology. The user just selects an area on the cSLO image and describe the scan (hor./ ver. LineScan, CircleScan, VolumeScan). Because of an optimized hardware design a single OCT Scan originally comes in a very high quality. In combination with the Roland Consult Robust OCT Tracker (RCROT) the signal noise ratio will be greatly reduced to a minimum. The OCT software is able to detect up to 7 layers automatically and visualize them in thickness maps. The integrated DLP Beamer helps the patient with an internal customizable fixation cross and reduces the motion artefacts.

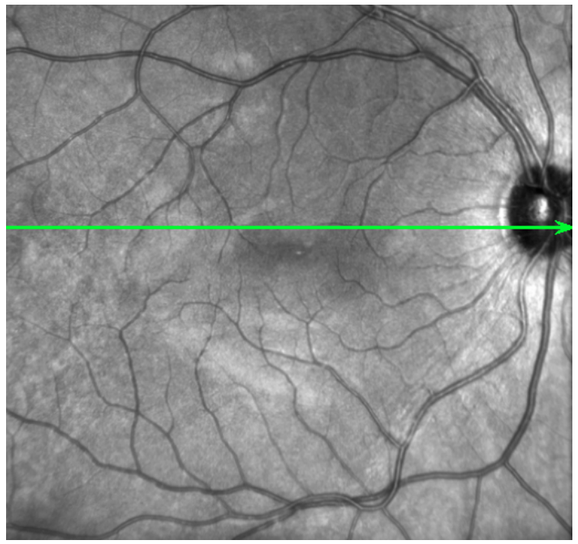
Laser Source:	830±50 nm, Super Luminescent Diode (SLD)
Max. scan speed:	25 000 scan / sec.
Scan depth:	2-2,5 mm
Axiale resolution:	5 µm
Transverse Resolution:	15 µm

RETImap with main components
Principle ERG, SLO and OCT

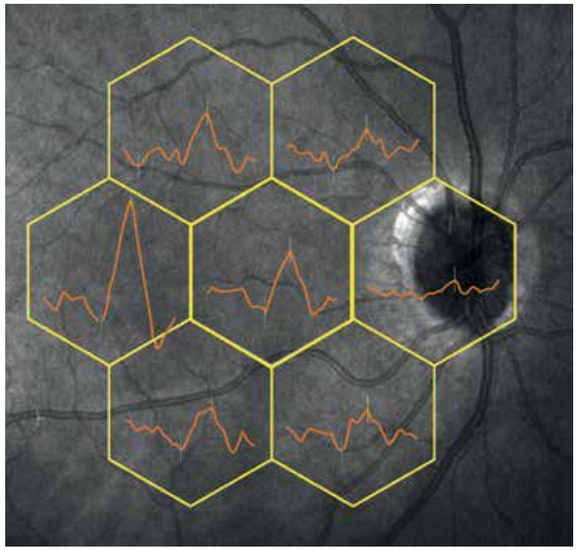


Scanning Laser Ophthalmoscope

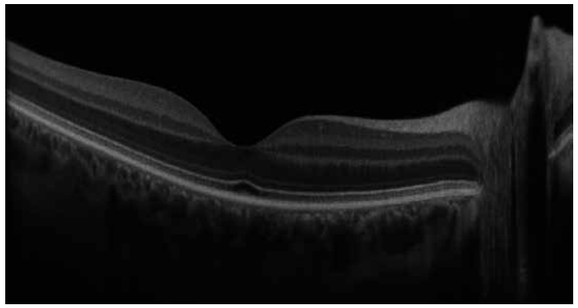
cSLO image with OCT line scan



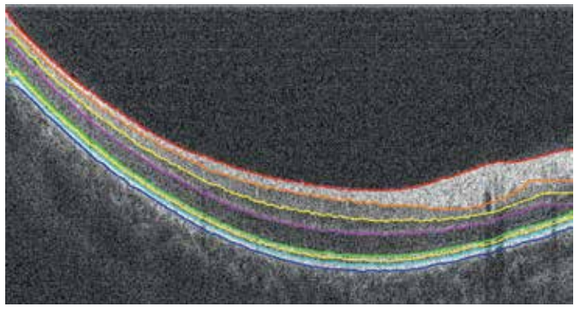
mfERG results superimpose on cSLO image



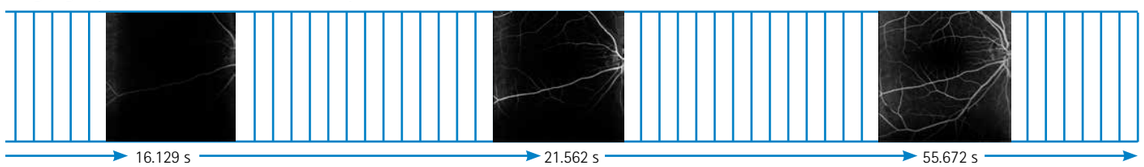
cSLO image with OCT LineScan

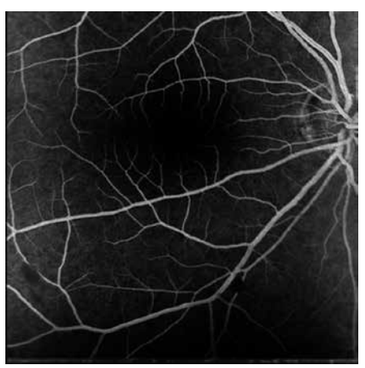


automatic layer detection



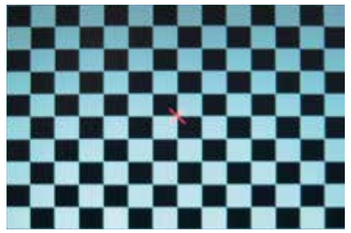
Angiography video with different phases



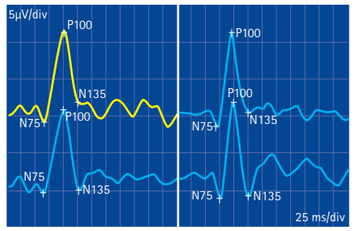


Measurement and Results

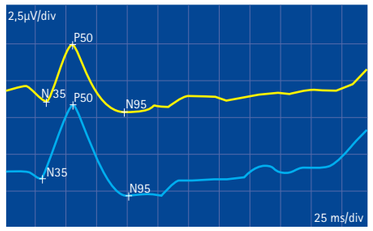
pattern stimulus ERG/VEP



pattern VEP

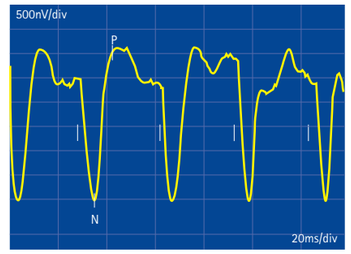


pattern ERG

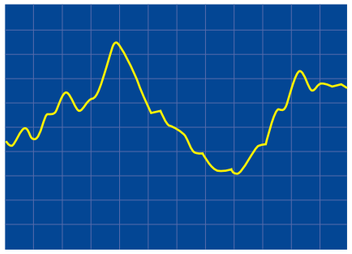


Pattern Handheld

steady state VEP

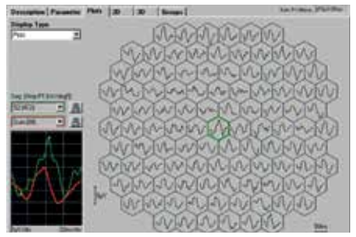


transient VEP

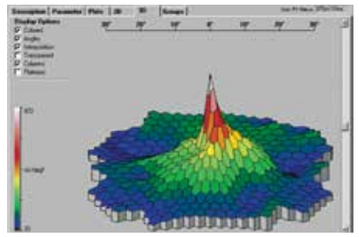


mfERG

normal mfERG plots

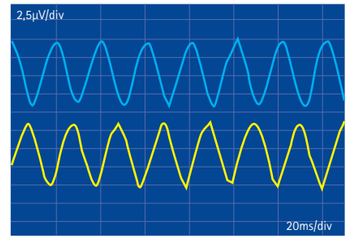


3D plot normal patient

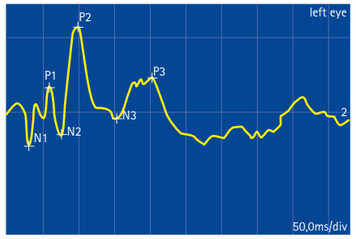


BABYflash ERG/VEP

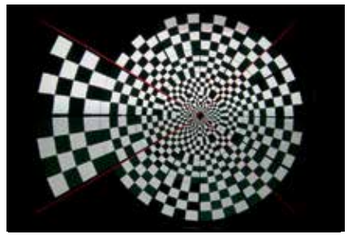
steady state photopic 30 Hz ERG



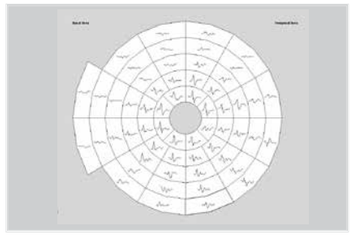
transient VEP



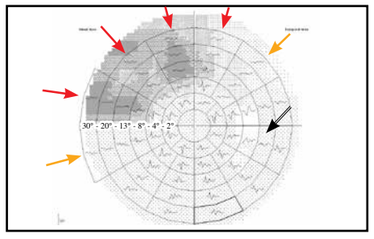
mfVEP



mfVEP plots

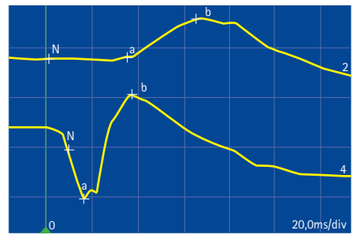


overlapping with visualfield

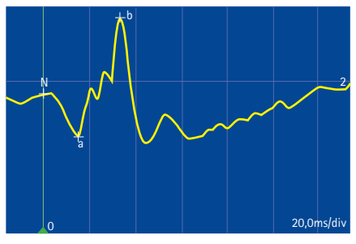


MINIganzfeld for flash ERG/VEP

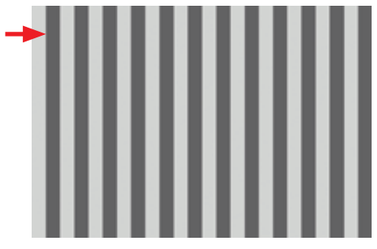
scotopic ERG



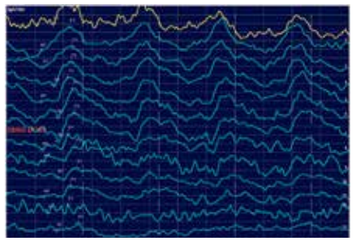
photopic ERG



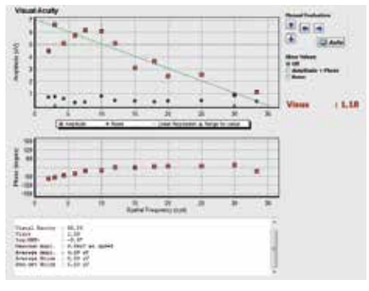
visual acuity



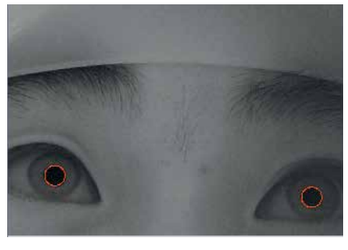
analyse curves



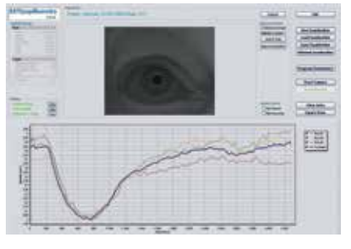
analyse regression curve



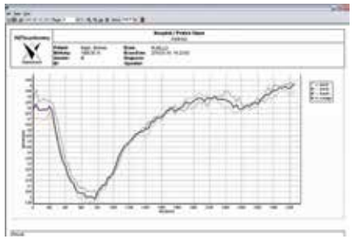
pupillometry



pupillometry measurement

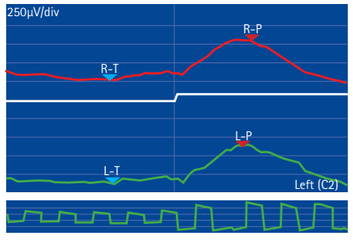


pupillometry result

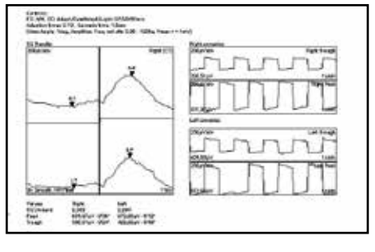


Ganzfeld Q450 EOG stimulus

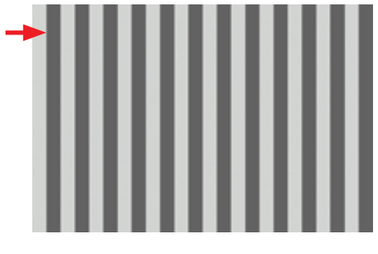
EOG result



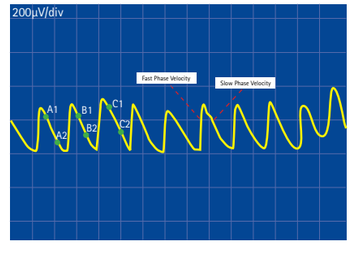
EOG printout normal result



nystagmography stimulus



nystagmography measurement left



nystagmography results